THE ECONOMIC IMPORTANCE AND CONTROL OF VERTEBRATE PESTS OF GRAMINACEOUS CROPS WITH PARTICULAR REFERENCE TO RICE (*Oryza sativa*) IN NIGERIA—A REVIEW

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ABSTRACT: Graminaceous crops, especially rice (Orzya sativa), have within the last years in Nigeria, surged to be of utmost economic importance, not in improving the economy but in depleting the country of fast foreign exchange. Attempts at improving and massively increasing the production and cultivation of rice (and other graminaceous crops) to meet the enormous demand have proved abortive. This is mainly a result of the ineffective control measures applied against destructive avian pests that sometimes reduce rice plantations to nothing.

Much research is still needed to enhance better and effective control strategies.

INTRODUCTION

Howard (1976) stated that "vertebrate pest problems are most importantly those of economic, political, social and sometimes even of religious standing and not really those of biological anomalies." Thus we find in countries like Nigeria and other developing or otherwise underdeveloped nations massive food shortages which on the surface give the impression of biological upheavals; but with indepth knowledge, it is revealed that most of the problems are in reality results of political, social and economic upheavals.

It is a well-known fact to students of ecology that, irrespective of the causes of biological problems resulting in massive disruption of the ecosystem, we are inevitably posed at clashes with other living animals of the biota resulting, of course, in lots of vertebrate pest problems.

Between 1973 and today the population of Nigeria has soared from a mere 80 million to over 100 million. This is also without recognition of the upsurges in population numbers inflicted by the inflow of illegal immigrants from neighbouring countries like Chad and Niger.

Within the said period also, because of the discovery of oil in the country and the "wealth" that such commodity "confers," there has been a tremendous change in the lifestyle of the people. Everybody has gone in search of the Golden Fleece, fleeing from the rural areas into the urban areas.

Nigeria, where small-scale farmers are and will long remain the backbone of agriculture, found itself left with "geriatric" farming. The young and able-bodied fled into the cities to work in the emerging industries, leaving the farms to rot away in the hands of the old and feeble, using their hoes and cutlasses. Even the few big mechanized plantations and cooperative farms are being gradually paralyzed as imported huge and expensive machinery lie waste with no spare parts and the expertise to handle them.

The feeding style of the people also changed in the wave of the apparent wealth as the government made education compulsory for children over 6 years of age and virtually free. As indicated in Table 1 the major food items pre-1970 in the order of importance were yam (Dioscorea), cassava (Manihot utilli-sima), maize (Zea mays), rice (Oryza sativa), and various legumes.

Table 1. Staple food items pre-1970 in order of importance. After 1970 the order of importance changed and the new order is designated following the staple food.

A YAM (C)	B CASSAVA (D)	C MAIZE (corn) (E)
Pounded flour	Cassava flour	Eaten fresh
Boiled	Cassava starch (fufu)	Maize flour
		*Animal feed
D RICE (A)	E LEGUMES (B)	
	Cowpeas — Flour	
	Pigeon peas — Boiled	

However, after 1970 rice catapulted to be the most important food crop. This is mainly because of the ease of cooking rice in contrast to the energy-expending ways of preparing yam and cassava. Emphasis was therefore laid on the increase in production of graminaceous crops, especially rice.

However, various factors, prominent among which was the deleterious effect of vertebrate pests on rice production, negated the efforts of the farmers to increase rice production to meet local demand.

The government therefore resorted to the importation of rice. Tables 2 and 3 indicate the huge amount of foreign exchange that has been involved in rice importation and the very sharp increase after 1975. The situation degenerated to a level where the country's foreign reserve was completely usurped, huge amounts were borrowed allegedly to pay for rice importation whilst corruption boomed in high quarters.

Table 2. Oni, S.A. and A. E. Ikpi. Rice production and marketing in Nigeria: An economic appraisal. West African Rice Development Association, Monrovia, September 1979.

Year	Quantity imported ('000 tonnes)	Value (₦million)
1965	1.375	0.214
1966	1.277	0.214
1967	1.459	0.284
1968	0.310	0.052
1969	0.641	0.050
1970	1.722	0.136
1971	0.251	0.051
1972	5.900	0.988
1973	0.400	0.266
1974	4.800	1.497
1975	6.700	2.377
1976	45.300	20.080
1977	381.438	127.900
1978	471.648	158.449

Table 3. Pai Associates International. The Nigerian Rice Industry - Final report submitted to the National Committee on Green Revolution, March 1981.

Year	Domestic production (tons)	Importation (tons)	Total (tons)	Self-sufficiency ratio	Total import (N'million)
1970	345,000	1,700	346,700	99.5	0.14
1971	383,000	300	383,300	99.9	0.05
1972	447,000	5,900	452,900	98.6	0.99
1973	487,000	1,100	488,100	99.7	0.27
1974	525,000	4,000	529,000	99.1	1.50
1975	515,000	6,700	521,700	98.7	2.38
1976	534,000	45,000	579,000	92.2	20.14
1977	667,000	413,000	1080,000	61.7	154.94
1978	695,000	770,000	1465,000	47.4	194.76
1979	850,000	700,000	1550,000	54.8	121.72*

* Figure is for January to June 1979.

VERTEBRATE PESTS OF RICE CROP

Funmilayo and Akande (1974, 1977) did an investigation into the determination of the vertebrate pest species in South-Western Nigeria. Among the manumalian pests, the cane rat (Thryonomys swinderianus) was the most important common pest species on rice whilst the weaver birds (Table 4) were the most common and damaging of the avian pests on rice crops.

Table 4. Vertebrate pests associated with upland rice production in Nigeria.

Scientific name	Common English name
MAMMALS	
Thryonomys swinderianus	Cane rat
Xerus erythropus	Red-legged ground squirrel
Arvicanthis niloticus	Nile harsh-furred rat
Mastomys natalensis	Multimammate rat
Lemniscomys striatus	Spotted grass mouse
Uranomys foxi	Fox brush-furred rat
Dasymys incomtus	Shaggy rat
Rattus rattus	Common black/grey rat
Mus (Leggada) musculoides	Pigmy rat
Tatera kempi	Kemp's gerbil
Cricetomys gambianus	Giant pouched rat
BIRDS	
Francolinus bicalcaratus	Bush fowl
Grecopsis egregia	African crake
Ploceus cucullatus	Village weaverbird
Cinnamopteryx castaneofuscus	Chestnut-and-black weaverbird
Quelea erythrops	Red-headed quelea
Lonchura cuculatus	Bronze mannikin
Lonchura bicolor	Blue-billed mannikin
Centropus senegalensis	Senegal coucal
Streptopelia semitorquata	Red-eyed turtle dove
Turfur afer	Red-billed wood dove
Stigmatopelia senegalensis	Laughing dove

Damage to rice occurs at all stages of cultivation. During planting, the seeds are dug up and eaten both by small rats and rodents such as Kemp's gerbil (Tatera kempi), multimammate rat (Mastomys natalensis), black rat (Rattus rattus), spotted grass mouse (Lemniscomys striatus), fox brush-furred rat (Uranomys foxi), shaggy rat (Dasymys incomtus), pigmy rat (Mus musculoides), and among birds, the bushfowl (Francolinus bicalcaratus), and doves where these occur.

During seeding, the bushfowl and small rodents still attack the germinating seeds; whilst at tillering, the cane rat can totally uproot the rice plants, depending on the population of the pest species.

However, the most devastating of the problems is at flowering when weaver birds converge in huge numbers to suck the milk of developing grains. Damage may sometimes be total (Funmilayo and Akande 1974, 1977). Finally, at harvesting and in storage commensal rats can foul and eat up the harvested grains.

CONTROL

The most common method of control against avian pests has been scaring, mainly the use of human scarers that are at present fast becoming obsolete as a result of diminishing human resources. The use

of local "concoctions" (Juju) as avian repellents is still very rampant. This is a substance whose composition cannot be scientifically classified because the designers (farmers) are sworn to secrecy in order to protect their trade.

Cane rats are controlled by attempts to decrease the population of the pest in the adjacent areas to the farm by burning the bush during the dry season prior to the planting period and driving the cane rats out with dogs.

Other forms of control include trapping, shooting, and in northern Nigeria where there are big government plantations, attempts against Quelea quelea have included the use of explosives and/or organophosphorus poisons (Pope and Ward 1972, Ward 1972, 1973).

DISCUSSION

There are still no effective means of controlling our vertebrate pests, especially birds. Thus, despite the huge amount spent on quelea control, the problem still persists. Inevitably, many rice farmers have given up in distress because of huge losses.

The government of Nigeria, already in deep waters due to its huge debts, can no longer afford to import rice. Thus a decree has been passed banning the total importation of rice, whilst lots of propaganda is being carried out encouraging the growth of other more viable crops and improving the image, declaring that better feeding is attained from other crops rather than from rice.

However, as vertebrate pest workers we need more efficient control methods against our pest species, which we believe can only be attained with more research work and therefore much better grants from the government. It ends up as a vicious circle because we need the government to help us to help the government and the people.

LITERATURE CITED

FUNMILAYO, O. 1973. A general survey of the incidence and control methods of vertebrate pests of crop plants in Western Nigeria. Research Bulletin No. 1. Institute of Agricultural Research and Training, University of Ife, Ibadan. 40 pp.

FUNMILAYO, O., and M. AKANDE. 1974. The ecology, economic impact and control of vertebrate pests of upland rice in the Western State of Nigeria. Research Bulletin No. 5. Institute of Agricultural Research and Training, University of Ife, Ibadan. 41 pp.

_____. 1977. Vertebrate pests of rice in South-Western Nigeria. Pans 23 (1): 38-48.

HOWARD, W. E. 1976. A philosophy of vertebrate pest control. Proc. VII Vertebrate Pest Conf. pp. 116-120.

POPE, G. C., and P. WARD. 1972. The effects of small applications of an organophosphorus poison, fenthion on weaver bird, Quelea quelea. Pestic. Sci. 3 (2): 197-205.

WARD, P. 1972. New views on controlling quelea. Span 15 (3): 136-137.

_____. 1973. A new strategy for the control of damage by queleas. Pans 19 (1): 97.